

# Orthodontically induced root resorption: a clinical and radiographic survey

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- I. Makedonas D, Hansen K. Diagnosis, screening and treatment of root resorption in orthodontic practices in Greece and Sweden. *Angle Orthod.* 2008 Mar;78(2):248-53.
- II. Makedonas D, Odman A, Hansen K. Management of root resorption in a large orthodontic clinic. *Swed Dent J.* 2009;33(4):173-80.
- III. Makedonas D, Lund H, Gröndahl K, Hansen K. Root resorption diagnosed with cone beam computed tomography after 6 months of orthodontic treatment with fixed appliance and the relation to risk factors. *Angle Orthod.* 2012 Mar;82(2):196-201.
- IV. Makedonas D, Lund H, Hansen K. Root resorption diagnosed with cone beam computed tomography after 6 months and at the end of orthodontic treatment with fixed appliances and the relation to risk factors. *Eur J Orthod.* Submitted.



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# Abstract

## Orthodontically induced root resorption: a clinical and radiographic survey

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In 2005 the Swedish Council on Health Technology Assessment (SBU), in a systematic review, Malocclusions and Orthodontic Treatment in a Health Perspective, concluded that there were low or contradicted evidence for an association between orthodontic treatment and the risks for negative side effects.

The aims of this study was to evaluate the perception of Greek and Swedish orthodontic practitioners view on orthodontically induced root resorption (OIRR), to investigate how root resorption is handled in a large orthodontic clinic and to prospectively study and correlate the prevalence and severity of root resorption seen after an initial treatment period and at the end of treatment, in a cohort of patients treated with fixed appliance.

Orthodontic practitioners' perception of how to evaluate, prevent, predict and diagnose root resorption during orthodontic treatment was the aim of the first two studies. Questionnaires were sent to and received from randomly selected Greek (n = 90) and Swedish (n-106) orthodontic practitioners (Study I) and records of all patients (n-902) who terminated active treatment during one year at the Department of Orthodontics, University Clinics of Odontology, Göteborg, Sweden were examined (Study II). The results showed that because there was no specific approach offered in the literature, the prevention and treatment reassessment in cases of root resorption relied on the individual practitioners' perception (Study I). Periapical radiographs were taken in most cases before treatment and at the end of treatment half of the patients were radiographically examined (Study II). When moderate root resorption was diagnosed the use of lower forces, resting periods and decrease of treatment time were common preventive measures (Study I and II). Light root resorption was found in less than 10% while severe root resorption was noted in 2% of the patients after active treatment (Study II).

The prevalence and severity of root resorption seen during a standardized orthodontic fixed appliance treatment was studied on a cohort of 156 adolescent patients. Cone beam computed tomography (CBCT) examinations were performed before and after treatment and, in a randomly chosen group of 97 patients, six months after treatment initiation (Study III). All teeth from first molar to first molar in both jaws were measured. The results showed that after 6 months of treatment, clinically significant resorption was diagnosed only in 4% of the patients (Study III). At the end of treatment, clinically significant resorption was diagnosed in 25.6% of the patients (Study IV) and no correlation with the resorption seen after 6 months were found (Study IV). The selected risk factors did not have any impact on the amount of resorption seen after 6 months of treatment (Study III) or at end of treatment (Study IV). Since no correlation was found between the severities of root resorption at the end of treatment with the one present at six months, one could conclude that a radiographic examination after 3-6 months of orthodontic treatment will not reduce the number of patients who will have one or more teeth with severe or extreme root resorptions (Study IV).

**Keywords:** Orthodontics, root resorption, prediction, CBCT, Angle Class I, fixed appliance, six months, risk factors

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